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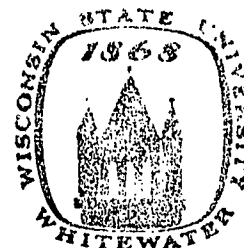
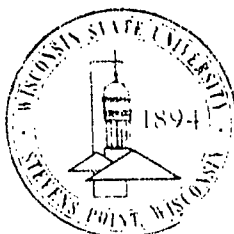
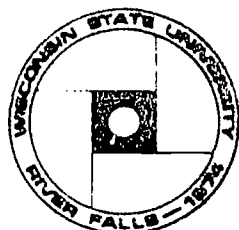
ABSTRACT

To evaluate the effectiveness of a traditional college English program, 100 incoming freshmen (Group A) were requested to postpone freshman English to their sophomore year; another 100 (Group B) were asked to postpone the first term to their sophomore year; another 100 (Group C) were asked to postpone their second term to the sophomore year; and another 100 (Group D) were asked to postpone their third term with the remainder of the freshmen (approximately 600) following the normal sequence. All assignments to experimental groups were randomly made. At the end of the academic year, 244 randomly selected subjects were administered a written proficiency examination, the Brown-Carlson Listening Test, the Iowa Reading test and a language-knowledge test devised by the staff. The data collected were subjected to analysis of variance. Results were: (1) Those students who had not taken the units on the language-knowledge part of the sequence scored low on the test devised to test this material; (2) No differences were noted between the experimental and control groups on the other measures applied; and (3) Women did better than men on all tests. It was concluded that the philosophy, content, and teaching methods of the freshman English sequence need to be reexamined and reevaluated. (Author/CK)

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ED054166

The Wisconsin State Universities Consortium of Research Development

Research Report

AN INVESTIGATION OF RELATIVE PERFORMANCE FACTORS IN FRESHMAN ENGLISH AT
WISCONSIN STATE UNIVERSITY - RIVER FALLS

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River Falls, Wisconsin

Cooperative Research

Wisconsin State Universities
and the
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TE 002 567

AN INVESTIGATION OF RELATIVE PERFORMANCE FACTORS IN FRESHMAN
ENGLISH AT WISCONSIN STATE UNIVERSITY-RIVER FALLS

Investigator: Robert H. Beck
Wisconsin State University-River Falls
Local Project No. 1

SUMMARY

Since it was reorganized in 1946, Freshman English at WSU-River Falls has tended to emphasize the traditional goals of the effective use of written language, the reading of English with ease and competence, the interpretation and evaluation of the written and spoken language and an examination of language in terms of its function.

To evaluate the effectiveness of the program, 100 incoming freshmen (Group A) were requested to postpone freshman English to their sophomore year, another 100 (Group B) were asked to postpone the first term to their sophomore year, another 100 (Group C) were asked to postpone their second term to the sophomore year, another 100 (Group D) were asked to postpone their third term with the remainder of the freshmen (approximately 600) following the normal sequence. All assignments to experimental groups were randomly made. At the end of the academic year, 244 randomly selected subjects were administered a written proficiency examination, the Brown-Carlson Listening Test, the Iowa Reading Test and a language-knowledge test devised by the staff.

The data collected in the above manner were subjected to analysis of variance with the following general results:

1. Those students who had not taken the units on the language-knowledge part of the sequence scored low on the test devised to test this material.
2. No differences were noted between the experimental groups and the control groups on the other measures applied.
3. Women did better than men on all tests.

Based on the evidence from this study, the philosophy, content and teaching methods of the Freshman English sequence need to be re-examined and re-evaluated.

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FINAL REPORT

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The Consortium of Research Development
Of The
Wisconsin State Universities

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Robert H. Beck
Wisconsin State University
River Falls, Wisconsin

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Introduction

Since 1946, Freshman English at Wisconsin State University - River Falls has evolved as a part of the general education program in the University and has been strongly oriented to intellectual content as well as to the traditional skills. The course has increasingly concentrated on the relationships of language to man's culture and personality, with special attention given to the language of the student's environment. For instance, in the first quarter, which is concerned with the nature of language, the student is introduced through the study of the history of English to the concept that language changes with culture; he learns through a contrast between "traditional" grammar and modern grammar that language has arbitrary form as well as lexical content; he learns through semantics that words and the things that words are "about" are not identical, and through a study of logic that statements have certain relationships to each other in meaningful speech and writing. In the second quarter, the student investigates the relationships between his culture and the language around him with attention to social and regional dialects, to the mass media, to advertising, to the language of politics, and to the language of social control. In the third quarter, the student works with language as a consciously refined and traditional instrument of art in the various genres of literature, not only to "admire" great literature but to gain some of its power of utterance for himself.

The course aims to achieve the following broad and traditional goals:

1. To develop art and ease in the use of written English
2. To read English of a scholarly style with relative ease and competence.
3. To interpret and evaluate written and spoken language with conscious standards.
4. To react appropriately to language in terms of its function.

The English staff was aware that no reliable measurement has ever been made on this campus of what is the achievement of its students who take the course and in the same manner there has been no measure of the

impact of the various quarters of the course on reaching the final objectives.

The following general hypothesis was offered for testing: nine quarter hours of Freshman English as now taught will produce greater achievement of course objectives than six quarter hours or no quarter hours of Freshman English. The English department was principally concerned with testing whether the intellectual content of its present course did contribute noticeably to achievement of its objectives or whether the students' gains in language maturity and usage came about through sheer passage of time. Does, for example, the reading in Freshman English noticeably help the student's comprehension or might he be gaining the same comprehension by reading a history textbook? Subjectively, we have all seen improvement in our students as the school year passed, but objectively, did we know that what we did in Freshman English was an effective factor? Or is the most important thing that happens to a student is that he simply becomes a year older in the college environment?

Dr. Robert Pooley in Teaching English Grammar (1957) and Dr. R. D. Williams in The Teaching of English in Wisconsin (1948) has made us aware that the teaching of traditional grammar alone has probably very little impact on compositional skills--and a survey of such materials as Henry C. Meckel's "Research on Teaching Composition and Literature" in Handbook of Research on Teaching (1963) and R. Braddock, R. Lloyd-Jones, and L. Schoer's Research in Written Composition (1963) has made us aware of the variables in English courses which have been tested in the past. The latter book was found to be most useful despite its modest length; copies were soon acquired for all Freshman English staff members for reading and discussion.

Methods

The procedures and design used in this investigation were based on the following experimental questions:

1. As measured by the evaluative criteria, what was the contribution of English 111 (fall quarter), English 112 (winter quarter), and English 113 (spring quarter)?
2. As measured by the evaluative criteria, what was the difference in impact among English 111, 112, and 113?

In setting up the design of the investigation, the following assumptions were made:

1. The number of available and eligible Freshmen for the fall of 1967 would be approximately 1,000.
2. The random assignment of subjects to the various subgroups would rule out the necessity for any type of pretest and matching.

The experimental design can best be described in the following tabular format:

Table 1.

The Experimental Design

| Group | Approximate Number | Per Cent of Total | Treatment |
|-------|--------------------|-------------------|--|
| A | 100 | 10 | Postpone all English to Sophomore year |
| B | 100 | 10 | Postpone English 111 to Sophomore year |
| C | 100 | 10 | Postpone English 112 to Sophomore year |
| D | 100 | 100 | Postpone English 113 to Sophomore year |
| E | 600 | 60 | Take English 111, 112, 113 in Freshman year. |

At the end of the academic year 244 randomly selected Freshmen were given the following examinations:

1. A writing proficiency examination rated by five readers on six criteria. This resulted in a 7-point rating scale with numerical scores ranging from 7 to 42.
2. The Brown-Carlson Listening Test.
3. The Iowa Reading Test.
4. A language-knowledge test devised by the staff.

These tests were administered by ten pre-trained staff members to the students on the 18th and 20th of May, 1968, in two 2-hour sessions. Clerical help was utilized to grade the Brown-Carlson, the Iowa Reading and the language-knowledge tests. The writing proficiency examination, numbered for individual student identification instead of names to preserve anonymity and rater bias were graded by five English teachers pre-trained by a method used at the University of Iowa to attain agreement on grading methods.

Clerical help was then used to ready the test scores and other background data on each student for the analysis in the Computer Center. Because of incomplete data, twelve subjects were removed from the pool leaving a group of 232 on whom the final analysis was made.

The data were then subjected to an analysis of variance testing equality of:

1. The various sequence pattern groups
2. Sexes
3. Size of high school class of origin
4. Occupational backgrounds of parents
5. Intended majors
6. State vocational professional plans

Findings

The data collected in this study were subjected to an analysis of variance testing equality of: (1) the various sequence pattern groups; (2) sexes; (3) size of high school class of origin; (4) occupational backgrounds of parents; (5) intended majors; and (6) stated vocational-professional plans. Appendix A, pages 7 -34, contains a summary of the analysis.

On the test of equality over the basic Freshman English groups, no differences were observed on the reading, writing and listening tests. On the test over Freshman English content, the null-hypothesis was rejected at the five per cent level. Group A, those who had not taken any part of the Freshman English sequence, scored low as compared with the other groups. Group D, those not taking English 113, and Group E, those taking the complete sequence, scored high.

On all four tests, women scored significantly higher than men. On the writing, listening, and the content test, this difference was significant at the one per cent level. On the reading test, this sex difference was significant at the five per cent level.

When student groups were compared in terms of the size of the high school from which they had graduated, no differences were observed on any of the four tests. The same statement can be made regarding the occupational backgrounds of the students.

When students were classified by major, no differences were observed on the reading tests and the writing tests. On the listening test, the hypothesis of equality was rejected at the five per cent level, with agriculture majors scoring low. On the content test, agriculture majors and unclassified students scored low, while biology, chemistry, mathematics, physics, business administration, and social science majors scored high. These differences were significant at the one per cent level.

When students were grouped by their vocational-professional plans, no differences were observed on the reading, listening and content tests. On the writing test, students planning careers in the professions, private business, government or as self-employed scored high, while those planning careers in travel or as housewives, or were undecided scored low. This difference was significant at the one per cent level.

At no point in the analysis was a significant inter-reaction observed.

Conclusions and Recommendations

The results of this experiment will have a profound effect on the nature and direction of the current Freshman English program. In summary, the uses to be made of the findings of our study are the following:

1. That on the basis of the various results of our experiment, we revise our syllabus content to meet our announced objectives in Freshman English.
2. That on the basis of our new knowledge of our students' backgrounds, we revise our syllabus content and teaching methods.
3. That on the basis of an analysis of variables in our students' background, we begin to use some predictions for those who might profitably be excused from Freshman English in order to reduce class size or reduce staff need.
4. That self-education for the Freshman English staff in English education continue.
5. And, that a foundation of material and experience be laid upon which to build further testing and refining of the Freshman English curriculum.

We are up against something very complex, involving the nature of gaining language maturity, the pedagogy of Freshman English, the nature of the teachers and students, the interaction of general campus culture and formal studies in the classroom, and discovering and isolating what it is possible to teach in the use of language. We have a hunch that more of the same kinds of work (increased writing, reading, working harder) is not the best to get at the problem, although for this year, that is the immediate direction of revision. We are ending up with more questions than when we started.

During the 1968-69 academic year, the various members of the Freshman English staff will be involved in a series of group sessions in an attempt to interpret the results of the experiment, to devise further ways and means of testing educational assumptions and the educational results. It is hoped that these may be applied during the 1969-70 academic year.

A P P E N D I X A

TABLE I

SUMS, SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE
EXPERIMENTAL GROUPS ON THE IOWA READING TEST

| | Group A | | Group B | | Group C | | Group D | | Group E | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| | Men | Women | Men | Women | Men | Women | Men | Women | Men | Women |
| N | 23 | 16 | 20 | 18 | 15 | 17 | 13 | 16 | 50 | 44 |
| Sums | 4,215 | 3,028 | 3,702 | 3,368 | 2,772 | 3,164 | 2,379 | 3,080 | 9,150 | 8,171 |
| SS | 776,615 | 574,748 | 687,890 | 631,566 | 514,706 | 592,314 | 436,661 | 594,802 | 1,682,398 | 1,525,073 |
| \bar{X} | 183.26 | 189.25 | 185.10 | 187.11 | 184.80 | 186.11 | 183.00 | 192.50 | 183.00 | 185.70 |
| ss | 4,170.435 | 1,699.000 | 2,649.800 | 1,375.778 | 2,440.400 | 3,437.765 | 1,304.000 | 1,902.000 | 7,948.000 | 7,681.159 |

SUMMARY OF THE ANALYSIS OF VARIANCE OF THE
IOWA READING TEST SCORES

| Source of Variation | df | S.S. | M.S. | F | F ₀₅ | F ₀₁ | Hypothesis |
|---------------------|-----|------------|---------|-------|-----------------|-----------------|------------|
| Between groups | 4 | 237.161 | 59.290 | | | | Accepted |
| Between sexes | 1 | 891.168 | 891.168 | 5.716 | 3.89 | 6.76 | Rejected |
| Interaction | 4 | 449.166 | 112.291 | | | | Accepted |
| Within | 222 | 34,608.337 | 155.893 | | | | |

TABLE II

SUMS, SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE EXPERIMENTAL GROUPS
ON THE WRITING PROFICIENCY EXAMINATION

| | Group A | | Group B | | Group C | | Group D | | Group E | |
|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| | Men | Women | Men | Women | Men | Women | Men | Women | Men | Women |
| N | 23 | 16 | 20 | 18 | 15 | 17 | 13 | 16 | 50 | 44 |
| Sums | 1,467 | 1,155 | 1,239 | 1,372 | 926 | 1,316 | 803 | 1,260 | 3,193 | 3,467 |
| SS | 97,827 | 84,845 | 83,395 | 106,358 | 60,098 | 103,516 | 52,307 | 102,598 | 212,975 | 282,659 |
| X | 63.78 | 72.18 | 61.95 | 76.22 | 61.73 | 77.41 | 61.76 | 78.75 | 63.86 | 78.79 |
| ss | 4,257.913 | 1,468.437 | 6,638.950 | 1,781.111 | 2,932.933 | 1,642.118 | 2,706.308 | 3,373.000 | 9,070.020 | 9,475.159 |

SUMMARY OF ANALYSIS OF VARIANCE OF THE WRITING
PROFICIENCY EXAMINATION SCORES

| Source of Variation | df | S.S. | M.S. | F | F ₀₅ | F ₀₁ | Hypothesis |
|---------------------|-----|------------|-----------|--------|-----------------|-----------------|------------|
| Between groups | 4 | 242.149 | 60.537 | 48.710 | 3.89 | 6.76 | Accepted |
| Between sexes | 1 | 9,510.851 | 9,510.851 | | | | Rejected |
| Interaction | 4 | 424.069 | 106.017 | | | | Accepted |
| Within | 222 | 43,345.949 | 195.252 | | | | Accepted |

TABLE III

SUMS, SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE EXPERIMENTAL GROUPS
ON THE BROWN-CARLSON LISTENING COMPREHENSION TEST

| | Group A | | Group B | | Group C | | Group D | | Group E | |
|-----------|---------|---------|-----------|---------|---------|---------|---------|---------|-----------|-----------|
| | Men | Women | Men | Women | Men | Women | Men | Women | Men | Women |
| N | 23 | 16 | 20 | 18 | 15 | 17 | 13 | 16 | 50 | 44 |
| Sums | 1,183 | 904 | 1,073 | 991 | 791 | 929 | 695 | 925 | 2,626 | 2,344 |
| SS | 61,551 | 51,772 | 58,713 | 55,195 | 42,191 | 51,531 | 37,559 | 53,843 | 140,804 | 126,186 |
| \bar{X} | 51.43 | 56.50 | 53.65 | 55.05 | 52.73 | 54.64 | 53.46 | 57.81 | 52.52 | 53.27 |
| ss | 703.652 | 696.000 | 1,146.550 | 634.944 | 478.933 | 763.882 | 403.231 | 366.437 | 2,886.480 | 1,314.727 |

SUMMARY OF ANALYSIS OF VARIANCE OF THE BROWN-CARLSON
LISTENING COMPREHENSION TEST SCORES

| Source of Variation | df | S.S. | M.S. | F | F ₀₅ | F ₀₁ | Hypothesis |
|---------------------|-----|-----------|---------|-------|-----------------|-----------------|------------|
| Between groups | 4 | 156.438 | 39.109 | 8.270 | 3.89 | 6.76 | Accepted |
| Between sexes | 1 | 349.992 | 349.992 | | | | Rejected |
| Interaction | 4 | 139.218 | 34.804 | | | | Accepted |
| Within | 222 | 9,394.836 | 42.319 | | | | |

TABLE IV

SUMS, SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE EXPERIMENTAL
GROUPS ON THE LANGUAGE KNOWLEDGE TEST

| | Group A | | Group B | | Group C | | Group D | | Group E | |
|------|---------|---------|---------|-----------|---------|---------|---------|---------|-----------|-----------|
| | Men | Women | Men | Women | Men | Women | Men | Women | Men | Women |
| N | 23 | 16 | 20 | 18 | 15 | 17 | 13 | 16 | 50 | 44 |
| Sums | 675 | 470 | 611 | 596 | 458 | 593 | 418 | 564 | 1,561 | 1,562 |
| SS | 20,503 | 14,506 | 19,593 | 20,748 | 14,306 | 21,591 | 13,790 | 20,400 | 51,635 | 57,498 |
| X | 29.34 | 29.37 | 30.55 | 33.11 | 30.53 | 34.88 | 32.15 | 35.25 | 31.22 | 35.50 |
| SS | 693.217 | 699.750 | 926.950 | 1,013.778 | 321.733 | 905.765 | 349.692 | 519.000 | 2,900.580 | 2,047.000 |

SUMMARY OF ANALYSIS OF VARIANCE OF THE
LANGUAGE KNOWLEDGE TEST SCORES

| Source of Variation | df | S.S. | M.S. | F | F ₀₅ | F ₀₁ | Hypothesis |
|---------------------|-----|------------|---------|-------|-----------------|-----------------|------------|
| Between groups | 4 | 465.384 | 116.346 | 2.488 | 2.41 | 3.41 | Rejected |
| Between sexes | 1 | 394.966 | 394.966 | 8.449 | 3.89 | 6.76 | Rejected |
| Interaction | 4 | 119.360 | 29.840 | | | | Accepted |
| Within | 222 | 10,377.465 | 46.745 | | | | |

TABLE V
SUMS, SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE EXPERIMENTAL
GROUPS ON THE IOWA READING TEST WHEN CLASSIFIED BY SIZE
OF HIGH SCHOOL ORIGIN

| Size of High School Origin | Group A | Group B | Group C | Group D | Group E |
|----------------------------|--|---|---|---|--|
| 0 - 199 | N 25 Sums 4,679 SS 880,269 X 187.16 ss 4,547.260 | 29 5,382 1,001,746 185.58 2,921.034 | 21 3,921 736,187 186.71 4,080.286 | 21 3,946 744,104 187.90 2,631.810 | 61 11,149 2,047,165 182.77 9,456.787 |
| 200 - 399 | N 7 Sums 1,288 SS 237,868 X 184.00 ss 876.000 | 4 743 138,167 185.75 154.750 | 2 395 78,017 197.50 4.500 | 5 972 189,698 194.40 741.200 | 18 3,391 642,127 188.38 3,300.278 |
| 400 or more | N 7 Sums 1,276 SS 233,226 X 182.29 ss 629.429 | 5 945 179,543 189.00 938.000 | 9 1,620 291,816 180.00 216.000 | 3 541 97,661 180.33 100.667 | 15 2,781 518,179 185.40 2,581.600 |

SUMMARY OF ANALYSIS OF VARIANCE

| Source of Variation | df | S.S. | M.S. | F | F ₀₅ | F ₀₁ | Hypothesis |
|---------------------|-----|------------|---------|-------|-----------------|-----------------|------------|
| H.S. Size of Origin | 2 | 757.449 | 378.724 | 2.476 | 3.04 | 4.71 | Accepted |
| Groups | 4 | 178.094 | 44.523 | | | | Accepted |
| Interaction | 8 | 1,233.418 | 154.177 | 1.008 | 1.98 | 2.60 | Accepted |
| Within | 217 | 33,179.601 | 152.901 | | | | |

TABLE VI
SUMS, SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE EXPERIMENTAL
GROUPS ON THE WRITING PROFICIENCY TEST WHEN CLASSIFIED BY SIZE
OF HIGH SCHOOL OF ORIGIN

| Size of High School Origin | Group A | Group B | Group C | Group D | Group E |
|----------------------------|---|--|--|--|---|
| 0 - 199 | N 25 Sums 1,715 SS 121,003 X 68.60 ss 3,354.000 | 29 2,014 148,502 69.44 8,633.172 | 21 1,472 107,842 70.09 4,661.810 | 21 1,488 110,166 70.85 4,730.581 | 61 4,319 321,913 70.80 16,113.639 |
| 200 - 399 | N 7 Sums 441 SS 30,185 X 63.00 ss 2,402.000 | 4 279 19,833 69.75 372.750 | 2 168 14,504 84.00 392.000 | 5 409 35,409 81.80 1,952.800 | 18 1,267 93,535 70.38 4,352.278 |
| 400 or more | N 7 Sums 466 SS 31,484 X 66.57 ss 461.715 | 5 318 21,418 63.60 1,193.200 | 9 602 41,268 65.89 1,000.889 | 3 166 9,330 55.33 144.667 | 15 1,074 80,186 71.60 3,287.600 |

SUMMARY OF ANALYSIS OF VARIANCE

| Source of Variation | df | S.S. | M.S. | F | F ₀₅ | F ₀₁ | Hypothesis |
|---------------------|-----|------------|---------|-------|-----------------|-----------------|------------|
| H.S. Size of Origin | 2 | 1,394.316 | 697.158 | 2.851 | 3.04 | 4.71 | Accepted |
| Groups | 4 | 716.579 | 179.145 | | | | Accepted |
| Interaction | 8 | 2,444.993 | 305.624 | 1,250 | 1.98 | 2.60 | Accepted |
| Within | 217 | 53,053.091 | 244.484 | | | | |

TABLE VII
SUMS, SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE EXPERIMENTAL
GROUPS ON THE LISTENING TEST WHEN CLASSIFIED BY SIZE
OF HIGH SCHOOL ORIGIN

| Size of High School Origin | Group A | Group B | Group C | Group D | Group E |
|----------------------------|--|---|---|---|--|
| 0 - 199 | N 25 Sums 1,322 SS 71,252 X 52.88 ss 1,344.640 | 29 1,578 87,180 54.41 1,315.034 | 21 1,148 63,486 54.66 728.667 | 21 1,185 67,577 56.42 709.143 | 61 3,228 173,038 52.91 2,218.590 |
| 200 - 399 | N 7 Sums 373 SS 20,011 X 53.28 ss 135.429 | 4 215 11,611 53.75 54.750 | 2 118 6,964 59.00 2.000 | 2 80 3,328 40.00 128.000 | 18 942 50,520 52.33 1,222.000 |
| 400 or more | N 7 Sums 392 SS 22,060 X 56.00 ss 108.000 | 5 271 15,117 54.20 428.800 | 9 454 23,272 50.44 370.222 | 3 155 8,059 51.67 50.667 | 15 800 43,432 53.33 765.333 |

SUMMARY OF ANALYSIS OF VARIANCE

| Source of Variation | df | S.S. | M.S. | F | F ₀₅ | F ₀₁ | Hypothesis |
|---------------------|-----|-----------|--------|---|-----------------|-----------------|------------|
| H.S. Size of Origin | 2 | 53.612 | 26.806 | | | | Accepted |
| Groups | 4 | 46.539 | 11.634 | | | | Accepted |
| Interaction | 8 | 336.826 | 42.103 | | | | Accepted |
| Within | 217 | 9,539.275 | 43.959 | | | | |

TABLE VIII
SUMS, SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE EXPERIMENTAL
GROUPS ON THE LANGUAGE KNOWLEDGE TEST WHEN CLASSIFIED BY SIZE
OF HIGH SCHOOL OF ORIGIN

| Size of High School Origin | Group A | | Group B | | Group C | | Group D | | Group E | |
|-------------------------------|-----------|---------|-----------|---------|---------|---------|---------|---------|-----------|-----------|
| 0 - 199 | N | 25 | 29 | 21 | 21 | 21 | 21 | 21 | 61 | 61 |
| | Sums | 710 | 898 | 704 | 704 | 704 | 700 | 700 | 2,006 | 2,006 |
| | SS | 20,862 | 29,550 | 24,540 | 24,540 | 24,540 | 24,094 | 24,094 | 69,190 | 69,190 |
| | \bar{X} | 28.40 | 30.96 | 33.52 | 33.52 | 33.52 | 33.33 | 33.33 | 32.88 | 32.88 |
| | ss | 698.000 | 1,742.966 | 939.238 | 939.238 | 939.238 | 760.667 | 760.667 | 3,222.197 | 3,222.197 |
| 200 - 399 | N | 7 | 4 | 2 | 2 | 2 | 5 | 5 | 18 | 18 |
| | Sums | 214 | 133 | 80 | 80 | 80 | 179 | 179 | 635 | 635 |
| | SS | 6,930 | 4,521 | 3,328 | 3,328 | 3,328 | 6,511 | 6,511 | 23,431 | 23,431 |
| | \bar{X} | 30.57 | 33.25 | 40.00 | 40.00 | 40.00 | 35.80 | 35.80 | 35.27 | 35.27 |
| | ss | 387.714 | 98.750 | 128.000 | 128.000 | 128.000 | 102.800 | 102.800 | 1,029.611 | 1,029.611 |
| 400 or more | N | 7 | 5 | 9 | 9 | 9 | 3 | 3 | 15 | 15 |
| | Sums | 221 | 176 | 267 | 267 | 267 | 103 | 103 | 482 | 482 |
| | SS | 7,217 | 6,270 | 8,029 | 8,029 | 8,029 | 3,585 | 3,585 | 16,512 | 16,512 |
| | \bar{X} | 31.57 | 35.20 | 29.67 | 29.67 | 29.67 | 34.33 | 34.33 | 32.13 | 32.13 |
| | ss | 239.714 | 74.800 | 108.000 | 108.000 | 108.000 | 48.667 | 48.667 | 1,023.733 | 1,023.733 |

SUMMARY OF ANALYSIS OF VARIANCE

| Source of Variation | df | S.S. | M.S. | F | F ₀₅ | F ₀₁ | Hypothesis |
|------------------------|-----|------------|--------|-------|-----------------|-----------------|------------|
| H.S. Size of Origin | 2 | 186.395 | 93.197 | 1.907 | 3.04 | 4.71 | Accepted |
| Groups | 4 | 251.590 | 62.897 | 1.287 | 2.41 | 3.41 | Accepted |
| Interaction | 8 | 342.960 | 42.870 | | | | Accepted |
| Within | 217 | 10,604.857 | 48.870 | | | | |

TABLE IX

SUMS, SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE EXPERIMENTAL
GROUPS ON THE IOWA READING TESTS WHEN CLASSIFIED BY
FATHER'S OCCUPATION

| Father's Occupation | Group A | Group B | Group C | Group D | Group E | |
|-------------------------|----------------------------|--|---|---|---|---|
| Group 1 - Farming | N Sums SS X ss | 9 1,677 313,181 186.33 700.000 | 15 2,775 515,431 185.00 2,056.000 | 14 2,613 489,671 186.64 1,973.214 | 11 2,051 384,005 186.45 1,586.727 | 25 4,641 864,133 185.64 2,577.760 |
| Group 2 - Mechanical | N Sums SS X ss | 5 947 179,731 189.40 369.200 | 6 1,102 202,932 183.66 531.333 | 2 378 71,642 189.00 200.000 | 9 1,669 310,323 185.44 816.222 | 16 2,930 539,206 183.12 2,649.750 |
| Group 3 - Professional | N Sums SS X ss | 8 1,522 290,134 190.25 573.500 | 4 765 146,555 191.25 248.750 | 2 360 65,250 180.00 450.000 | 3 557 103,697 185.66 280.667 | 13 2,479 473,385 190.69 658.769 |
| Group 4 - Services | N Sums SS X ss | 5 938 177,238 187.60 1,269.200 | 6 1,138 216,280 189.66 439.333 | 7 1,303 243,745 186.14 1,200.857 | 5 990 196,204 198.00 184.000 | 12 2,262 428,196 188.50 1,809.000 |
| Group 5 - Miscellaneous | N Sums SS X ss | 8 1,409 250,211 176.12 2,050.875 | 6 1,097 201,009 182.83 440.833 | 4 744 139,650 186.00 1,266.000 | 9 1,673 312,413 185.89 1,420.889 | 28 5,009 902.551 178.89 6,476.679 |

TABLE IX A
SUMMARY OF ANALYSIS OF VARIANCE

| Source of Variation | df | S.S. | M.S. | F | F ₀₅ | F ₀₁ | Hypothesis |
|---------------------|-----|------------|---------|-------|-----------------|-----------------|------------|
| Occupations | 4 | 1,021.632 | 255.408 | 1.640 | 2.41 | 3.41 | Accepted |
| Groups | 4 | 165.080 | 41.270 | | | | Accepted |
| Interaction | 16 | 1,571.914 | 98.244 | | | | Accepted |
| Within | 207 | 32,229.540 | 155.698 | | | | |

TABLE X
SUMS, SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE EXPERIMENTAL
GROUPS ON THE WRITING PROFICIENCY TEST WHEN CLASSIFIED BY
FATHER'S OCCUPATION

| Father's Occupation | Group A | Group B | Group C | Group D | Group E |
|---------------------|-----------|-----------|-----------|-----------|-----------|
| Group 1 - | 9 | 15 | 14 | 11 | 25 |
| Farming | | | | | |
| Sums | 586 | 968 | 1,026 | 770 | 1,803 |
| SS | 39,320 | 68,442 | 76,650 | 55,296 | 136,049 |
| X | 65.11 | 64.53 | 73.28 | 70.00 | 72.12 |
| ss | 1,164.889 | 5,973.733 | 1,458.857 | 1,396.000 | 6,016.640 |
| Group 2 - | 5 | 6 | 2 | 9 | 16 |
| Mechanical | | | | | |
| Sums | 333 | 403 | 150 | 620 | 1,080 |
| SS | 22,681 | 28,255 | 11,492 | 44,708 | 77,188 |
| X | 66.60 | 67.16 | 75.00 | 68.88 | 67.50 |
| ss | 503.200 | 1,186.833 | 242.000 | 1,996.889 | 4,288.000 |
| Group 3 - | 8 | 4 | 2 | 3 | 13 |
| Professional | | | | | |
| Sums | 511 | 317 | 173 | 178 | 937 |
| SS | 34,597 | 25,389 | 15,005 | 11,220 | 69,917 |
| X | 63.87 | 79.25 | 86.50 | 59.33 | 72.07 |
| ss | 1,956.875 | 266.750 | 40.500 | 658.667 | 2,380.923 |
| Group 4 - | 5 | 6 | 7 | 5 | 12 |
| Services | | | | | |
| Sums | 330 | 405 | 408 | 409 | 820 |
| SS | 22,196 | 27,615 | 46,032 | 34,453 | 58,940 |
| X | 66.00 | 67.50 | 58.28 | 81.80 | 68.33 |
| ss | 416.000 | 277.500 | 2,251.429 | 996.800 | 2,906.667 |
| Group 5 - | 8 | 6 | 4 | 9 | 28 |
| Miscellaneous | | | | | |
| Sums | 588 | 456 | 253 | 654 | 2,020 |
| SS | 44,840 | 36,208 | 16,251 | 50,292 | 153,540 |
| X | 73.50 | 76.00 | 63.25 | 72.67 | 72.14 |
| ss | 1,622.000 | 1,552.000 | 248.750 | 2,768.000 | 7,811.429 |

TABLE X A
SUMMARY OF ANALYSIS OF VARIANCE

| Source of Variation | df | S.S. | M.S. | F | F ₀₅ | F ₀₁ | Hypothesis |
|---------------------|-----|------------|---------|-------|-----------------|-----------------|------------|
| Occupations | 4 | 348.909 | 87.227 | | | | Accepted |
| Groups | 4 | 350.963 | 87.740 | | | | Accepted |
| Interaction | 16 | 5,521.187 | 345.074 | 1.417 | 1.69 | 2.09 | Accepted |
| Within | 207 | 50,381.331 | 243.388 | | | | |

TABLE XI
SUMS, SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE EXPERIMENTAL
GROUPS ON THE LISTENING TEST WHEN CLASSIFIED BY
FATHER'S OCCUPATION

| Father's Occupation | Group A | | Group B | | Group C | | Group D | | Group E | |
|----------------------------|-----------|---------|---------|---------|---------|-----------|---------|--|---------|--|
| Group 1 - Farming | N | 9 | 15 | 14 | 11 | 25 | | | | |
| | Sums | 450 | 817 | 769 | 599 | 1,342 | | | | |
| | SS | 22,964 | 45,265 | 42,943 | 32,975 | 72,956 | | | | |
| | \bar{X} | 50.00 | 54.46 | 54.92 | 54.45 | 53.68 | | | | |
| | ss | 464.000 | 765.733 | 702.929 | 356.727 | 917.440 | | | | |
| Group 2 - Mechanical | N | 5 | 6 | 2 | 9 | 16 | | | | |
| | Sums | 289 | 309 | 116 | 495 | 823 | | | | |
| | SS | 16,849 | 16,023 | 6,730 | 27,685 | 43,815 | | | | |
| | \bar{X} | 57.80 | 51.50 | 58.00 | 55.00 | 51.43 | | | | |
| | ss | 144.800 | 109.500 | 2.000 | 460.000 | 1,481.937 | | | | |
| Group 3 - Professional | N | 8 | 4 | 2 | 3 | 13 | | | | |
| | Sums | 413 | 227 | 112 | 186 | 680 | | | | |
| | SS | 21,537 | 13,127 | 6,322 | 11,558 | 35,888 | | | | |
| | \bar{X} | 51.62 | 56.75 | 56.00 | 62.00 | 52.30 | | | | |
| | ss | 215.875 | 244.750 | 50.000 | 26.000 | 318.769 | | | | |
| Group 4 - Service | N | 5 | 6 | 7 | 5 | 12 | | | | |
| | Sums | 263 | 323 | 371 | 296 | 659 | | | | |
| | SS | 14,071 | 17,495 | 19,747 | 17,598 | 36,483 | | | | |
| | \bar{X} | 52.60 | 53.83 | 53.00 | 59.20 | 54.91 | | | | |
| | ss | 237.200 | 106.833 | 84.000 | 74.800 | 292.917 | | | | |
| Group 5 - Miscellaneous | N | 8 | 6 | 4 | 9 | 28 | | | | |
| | Sums | 443 | 322 | 213 | 478 | 1,466 | | | | |
| | SS | 24,707 | 17,642 | 11,505 | 25,612 | 77,848 | | | | |
| | \bar{X} | 55.37 | 53.67 | 53.25 | 53.11 | 52.36 | | | | |
| | ss | 175.875 | 361.333 | 162.750 | 224.889 | 1,092.429 | | | | |

TABLE XI A
SUMMARY OF ANALYSIS OF VARIANCE

| Source of Variation | df | S.S. | M.S. | F | F ₀₅ | F ₀₁ | Hypothesis |
|---------------------|-----|-----------|--------|-------|-----------------|-----------------|------------|
| Occupations | 4 | 104.731 | 26.182 | | | | Accepted |
| Groups | 4 | 270.003 | 67.500 | 1.539 | 2.41 | 3.41 | Accepted |
| Interaction | 16 | 685.931 | 42.870 | | | | Accepted |
| Within | 207 | 9,073.486 | 43.833 | | | | |

TABLE XII
SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE EXPERIMENTAL
GROUPS ON THE LANGUAGE KNOWLEDGE TEST WHEN CLASSIFIED BY
FATHER'S OCCUPATION

| Father's Occupation | Group A | Group B | Group C | Group D | Group E |
|-------------------------|---|---|---|---|---|
| Group 1 - Farming | 9 N Sums 251 SS 7,267 X 27.88 ss 266.889 | 15 493 17,443 32.86 1,239.733 | 14 491 17,967 35.07 746.929 | 11 375 13,019 34.09 234.909 | 25 827 28,549 33.08 1,191.840 |
| Group 2 - Mechanical | 5 N Sums 151 SS 4,663 X 30.20 ss 102.800 | 6 166 4,806 27.66 213.333 | 2 77 3,025 38.50 60.500 | 9 301 10,515 33.44 448.222 | 16 523 17,981 32.68 885.438 |
| Group 3 - Professional | 8 N Sums 260 SS 8,746 X 32.50 ss 296.000 | 4 126 4,070 31.50 101.000 | 2 67 2,285 33.50 40.500 | 3 112 4,320 37.33 138.667 | 13 438 14,934 33.69 176.769 |
| Group 4 - Services | 5 N Sums 128 SS 3,368 X 25.60 ss 91.299 | 6 183 5,667 30.50 85.500 | 7 205 6,161 29.28 157.429 | 5 175 6,199 35.00 74.000 | 12 421 15,589 35.08 618.917 |
| Group 5 - Miscellaneous | 8 N Sums 227 SS 6,657 X 28.37 ss 215.875 | 6 199 6,755 33.17 154.833 | 4 123 3,843 30.75 60.750 | 9 275 8,661 30.56 258.222 | 28 914 32,030 32.64 2,244.429 |

TABLE XII A
SUMMARY OF ANALYSIS OF VARIANCE

| Source of Variation | df | S.S. | M.S. | F | F ₀₅ | F ₀₁ | Hypothesis |
|---------------------|-----|------------|---------|-------|-----------------|-----------------|------------|
| Occupations | 4 | 147.734 | 36.933 | 2.775 | 2.41 | 3.41 | Accepted |
| Groups | 4 | 552.694 | 138.173 | | | | Rejected |
| Interaction | 16 | 614.768 | 38.423 | | | | Accepted |
| Within | 207 | 10,304.682 | 49.781 | | | | |

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TABLE XIII
SUMS, SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE EXPERIMENTAL GROUPS ON THE
IOWA READING TESTS WHEN CLASSIFIED UNDER RELATED COLLEGE MAJORS

| Major Groupings | Group A | Group B | Group C | Group D | Group E |
|---|--|--|--|--|---|
| Sciences & Mathematics | N 8 Sums 1,468 SS 271,870 X 183.50 ss 2,492.000 | 9 1,707 324,609 189.66 848.000 | 4 750 140,814 187.50 189.000 | 3 587 114,937 195.66 80.667 | 10 1,872 350,996 187.20 557.600 |
| Social Sciences & Business Administration | N 6 Sums 1,102 SS 203,216 X 183.66 ss 815,333 | 4 781 152,763 195.25 272.750 | 6 1,108 206.082 184.66 1,471.333 | 2 388 75,370 194.00 98.000 | 19 3,453 631,265 181.73 3,727.684 |
| Humanities | N 11 Sums 2,117 SS 408,589 X 192.45 ss 1,162.727 | 5 918 168,720 183.60 178.200 | 9 1,656 306,226 184.00 1,722.000 | 8 1,495 280,469 186.87 1,090.875 | 22 4,024 739,186 182.90 3,159.818 |
| Agriculture | N 2 Sums 338 SS 57,140 X 169.00 ss 18.000 | 6 1,085 197,039 180.83 834.833 | 4 765 146,397 191.25 90.750 | 8 1,437 258,579 179.62 457.875 | 6 1,129 212,715 188.16 274.833 |
| Unclassified | N 5 Sums 928 SS 172,482 X 185.60 ss 245.200 | 6 1,061 188,075 176.83 454.833 | 3 581 113,531 193.66 1,010.667 | 2 394 77,618 197.00 0.000 | 11 1,990 362,052 180.90 2,042.909 |
| Miscellaneous | N 7 Sums 1,290 SS 238,066 X 184.28 ss 317.429 | 7 1,325 251,001 189.28 197.429 | 6 1,076 193,770 179.33 807.333 | 7 1,351 261,739 193.00 996.000 | 26 4,853 911,257 186.65 5,425.885 |

TABLE XIII A

SUMMARY OF ANALYSIS OF VARIANCE

| Source of Variation | df | S.S. | M.S. | F | F ₀₅ | F ₀₁ | Hypothesis |
|---------------------|-----|------------|---------|-------|-----------------|-----------------|------------|
| Major Groupings | 5 | 758.113 | 151.622 | | | | |
| Groups | 4 | 1,123.157 | 280.789 | 1.826 | 2.41 | 3.41 | Accepted |
| Interaction | 20 | 4,042.944 | 202.147 | 1.314 | 1.62 | 1.97 | Accepted |
| Within | 202 | 31,059.963 | 153.762 | | | | Accepted |

TABLE XIV
SUMS, SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE EXPERIMENTAL GROUPS ON THE
WRITING PROFICIENCY TEST WHEN CLASSIFIED UNDER RELATED COLLEGE MAJORS

| Major Groupings | Group A | Group B | Group C | Group D | Group E |
|---|--|--|--|--|--|
| Sciences & Mathematics | N 8 Sums 600 SS 45,410 X 75.00 ss 410.000 | 9 628 45,720 69.77 1,899.556 | 4 272 18,730 68.00 234.000 | 3 248 21,536 82.66 1,034.667 | 10 763 59,047 76.30 830.100 |
| Social Sciences & Business Administration | N 6 Sums 390 SS 26,080 X 65.00 ss 730.00 | 4 286 21,898 71.50 1,449.000 | 6 403 28,883 67.16 1,814.833 | 2 164 13,466 82.00 18.000 | 19 1,296 94,564 68.21 6,163.158 |
| Humanities | N 11 Sums 796 SS 59,388 X 72.36 ss 1,786.545 | 5 358 26,254 71.60 621.200 | 9 669 51,175 74.33 1,446.000 | 8 572 42,020 71.50 1,122.000 | 22 1,513 109,193 68.77 5,139.864 |
| Agriculture | N 2 Sums 112 SS 6,322 X 56.00 ss 50.000 | 6 328 20,036 54.66 2,105.333 | 4 271 20,227 67.75 1,866.750 | 8 497 32,527 62.12 1,650.875 | 6 393 27,707 65.50 1,965.500 |
| Unclassified | N 5 Sums 304 SS 19,004 X 60.80 ss 520.800 | 6 409 29,875 68.16 1,994.833 | 3 215 16,093 71.66 684.667 | 2 168 14,400 84.00 288.000 | 11 745 53,153 67.72 2,696.182 |
| Miscellaneous | N 7 Sums 420 SS 26,468 X 60.00 ss 1,268.000 | 7 540 42,126 77.14 468.857 | 6 412 28,506 68.67 215.333 | 7 476 34,800 68.00 2,432.000 | 26 1,950 151,970 75.00 5,720.000 |

TABLE XIV A
SUMMARY OF ANALYSIS OF VARIANCE

| Source of Variation | df | S.S. | M.S. | F | F ₀₅ | F ₀₁ | Hypothesis |
|---------------------|-----|------------|---------|-------|-----------------|-----------------|------------|
| Major Groupings | 5 | 2,591.704 | 518.340 | 2.153 | 2.26 | 3.11 | Accepted |
| Groups | 4 | 1,660.092 | 415.023 | 1.724 | 2.41 | 3.41 | Accepted |
| Interaction | 20 | 477.995 | 23.899 | | | | Accepted |
| Within | 202 | 48,626.053 | 240.723 | | | | |

TABLE XV
SUMS, SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE EXPERIMENTAL GROUPS ON THE
LISTENING TEST WHEN CLASSIFIED UNDER RELATED COLLEGE MAJORS

| Major Groupings | Group A | Group B | Group C | Group D | Group E |
|---|--|--|--|--|---|
| Sciences & Mathematics | N 8 Sums 454 SS 25,900 X 56.75 ss 135.500 | 9 519 30,297 57.66 368.000 | 4 226 12,810 56.50 41.000 | 3 170 9,666 56.55 32.667 | 10 529 29,009 52.90 1,024.900 |
| Social Sciences & Business Administration | N 6 Sums 329 SS 18,103 X 54.83 ss 62.833 | 4 209 11,197 52.25 276.750 | 6 341 19,479 56.83 98.833 | 2 122 7,444 61.00 2.000 | 19 984 51,882 51.78 921.158 |
| Humanities | N 11 Sums 610 SS 34,328 X 55.45 ss 500.727 | 5 272 14,970 54.40 173.200 | 9 496 27,738 55.11 402.889 | 8 439 24,277 54.87 186.875 | 22 1,159 61,725 52.68 666.773 |
| Agriculture | N 2 Sums 100 SS 5,072 X 50.00 ss 72.000 | 6 299 15,295 49.83 394.833 | 4 192 9,322 48.00 106.000 | 8 420 22,448 52.50 398.000 | 6 314 16,548 52.33 155.33 |
| Unclassified | N 5 Sums 265 SS 14,083 X 53.00 ss 38.000 | 6 320 17,090 53.33 23.333 | 3 147 7,259 49.00 56.000 | 2 118 6,980 59.00 18.000 | 11 582 31,122 52.90 328.909 |
| Miscellaneous | N 7 Sums 329 SS 15,837 X 47.00 ss 110.000 | 7 379 20,703 54.14 122.857 | 6 318 17,114 53.00 260.000 | 7 417 24,943 59.57 101.714 | 26 1,402 76,704 53.92 1,103.846 |

TABLE XV A
SUMMARY OF ANALYSIS OF VARIANCE

| Source of Variation | df | S.S. | M.S. | F | F ₀₅ | F ₀₁ | Hypothesis |
|---------------------|-----|-----------|---------|-------|-----------------|-----------------|------------|
| Major Groupings | 5 | 493.015 | 98.603 | 2.428 | 2.26 | 3.11 | Rejected |
| Groups | 4 | 454.737 | 113.684 | 2.800 | 2.41 | 3.41 | Rejected |
| Interaction | 20 | 693.034 | 34.651 | | | | Accepted |
| Within | 202 | 8,202.930 | 40.608 | | | | |

TABLE XVI
SUMS, SUMS OF SQUARES AND REDUCTION DATA FOR EACH OF THE EXPERIMENTAL GROUPS ON THE
LANGUAGE KNOWLEDGE TEST WHEN CLASSIFIED BY RELATED COLLEGE MAJORS

| Major Groupings | Group A | Group B | Group C | Group D | Group E |
|---|--|--|--|---------------------------------------|---|
| Sciences & Mathematics | N 8 Sums 254 SS 8,230 \bar{X} 31.75 ss 165.500 | 9 319 11,779 35.44 472.222 | 4 141 5,005 35.25 34.750 | 3 113 4,357 37.66 100.667 | 10 347 12,367 34.70 326.100 |
| Social Sciences & Business Administration | N 6 Sums 176 SS 5,582 \bar{X} 29.33 ss 419.33 | 4 151 5,785 37.75 84.750 | 6 220 8,568 36.66 501.333 | 2 76 2,986 38.00 98.000 | 19 603 20,369 31.73 1,231.684 |
| Humanities | N 11 Sums 338 SS 10,790 \bar{X} 30.72 ss 404.182 | 5 149 4,587 29.80 146.800 | 9 307 10,825 34.11 352.889 | 8 275 9,617 34.37 163.875 | 22 710 23,946 32.27 1,032.364 |
| Agriculture | N 2 Sums 51 SS 1,341 \bar{X} 25.50 ss 40.500 | 6 174 5,386 29.00 340.000 | 4 117 3,487 29.25 64.750 | 8 245 7,653 30.62 149.875 | 6 188 6,046 31.33 155.333 |
| Unclassified | N 5 Sums 125 SS 3,273 \bar{X} 25.00 ss 148.000 | 6 153 4,013 25.50 111.500 | 3 91 2,793 30.33 32.667 | 2 62 2,050 31.00 128.000 | 11 372 13,634 33.81 1,053.810 |
| Miscellaneous | N 7 Sums 201 SS 5,793 \bar{X} 28.71 ss 21.429 | 7 221 7,191 31.57 213.714 | 6 175 5,219 29.17 114.833 | 7 251 9,127 35.86 126.857 | 26 903 32,771 34.73 1,409.115 |

TABLE XVI A
SUMMARY OF ANALYSIS OF VARIANCE

| Source of Variation | df | S.S. | M.S. | F | F ₀₅ | F ₀₁ | Hypothesis |
|---------------------|-----|-----------|---------|-------|-----------------|-----------------|------------|
| Major Groupings | 5 | 846.394 | 169.278 | 3.545 | 2.26 | 3.11 | Rejected |
| Groups | 4 | 641.917 | 160.497 | 3.361 | 2.41 | 3.41 | Rejected |
| Interaction | 20 | 475.459 | 23.773 | | | | Accepted |
| Within | 202 | 9,644.658 | | | | | |

TABLE XVII
SUMS, SUMS OF SQUARES AND REDUCTION DATA OF THE SCORES OF THE EXPERIMENTAL GROUPS ON THE
IOWA READING TEST WHEN GROUPED BY VOCATIONAL-PROFESSIONAL PLANS

| Vocational- Professional Plans | Group A | Group B | Group C | Group D | Group E |
|-----------------------------------|-----------|-----------|-----------|-----------|-----------|
| Teaching | N 17 | 15 | 16 | 12 | 30 |
| Sums | 3,221 | 2,805 | 2,927 | 2,244 | 5,535 |
| SS | 612,453 | 525,323 | 538,867 | 421,018 | 1,026,653 |
| \bar{X} | 189.47 | 187.00 | 182.93 | 187.00 | 184.50 |
| ss | 2,168.235 | 788.000 | 3,408.938 | 1,390.000 | 5,445.500 |
| Professions, | N 8 | 3 | 3 | 3 | 22 |
| Private busi- | 1,429 | 580 | 581 | 566 | 4,035 |
| ness, self- | 257,435 | 112,158 | 112,973 | 107,138 | 745,173 |
| employed & | 178.62 | 193.33 | 193.66 | 188.66 | 183.40 |
| Government | 2,089.875 | 24.667 | 452.667 | 352.667 | 5,117.318 |
| Housewife, | N 10 | 13 | 8 | 9 | 28 |
| Travel & | 1,868 | 2,365 | 1,504 | 1,689 | 5,116 |
| Undecided | 349,686 | 432,623 | 283,962 | 318,245 | 938,974 |
| \bar{X} | 186.80 | 181.92 | 188.00 | 187.66 | 182.71 |
| ss | 743.600 | 2,374.923 | 1,210.000 | 1,276.000 | 4,207.714 |
| Miscellaneous | N 3 | 5 | 3 | 2 | 7 |
| Sums | 559 | 948 | 565 | 398 | 1,330 |
| SS | 104,323 | 180,152 | 106,557 | 79,234 | 253,070 |
| \bar{X} | 186.33 | 189.60 | 188.33 | 199.00 | 190.00 |
| ss | 162.667 | 411.200 | 148.667 | 32.000 | 370.000 |

SUMMARY OF ANALYSIS OF VARIANCE

| Source of Variance | df | S.S. | M.S. | F | F ₀₅ | F ₀₁ | Hypothesis |
|-----------------------|-----|------------|---------|---|-----------------|-----------------|------------|
| Plans | 3 | 466.052 | 155.350 | | | | Accepted |
| Groups | 4 | 478.751 | 119.687 | | | | Accepted |
| Interaction | 12 | 1,402.474 | 116.872 | | | | Accepted |
| Within | 197 | 32,174.638 | 163.323 | | | | |

TABLE XVIII
SUMS, SUMS OF SQUARES AND REDUCTION DATA OF THE SCORES OF THE EXPERIMENTAL GROUPS ON THE
WRITING PROFICIENCY TEST WHEN CLASSIFIED BY VOCATIONAL-PROFESSIONAL PLANS

| Vocational- Professional Plans | Group A | Group B | Group C | Group D | Group E |
|--|--|---|---|---|--|
| Teaching | N 17 Sums 1,200 SS 87,442 X 70.58 ss 2,736.118 | 15 1,115 84,639 74.33 1,757.333 | 16 1,163 86,923 72.68 2,387.438 | 12 810 56,960 67.50 2,285.000 | 30 2,158 161,504 71.93 6,271.867 |
| Professions, Private busi-Sums ness, Self- employed & Government | N 8 539 37,515 67.37 1,199.875 | 3 269 24,161 89.66 40.667 | 3 238 19,330 79.33 448.667 | 3 254 21,908 84.66 402.667 | 22 1,628 126,036 74.00 5,564.000 |
| Housewife, Travel & Undecided | N 10 634 41,484 63.40 1,288.400 | 13 806 53,408 62.00 3,436.000 | 8 545 39,215 68.12 2,086.875 | 9 639 49,223 71.00 3,854.000 | 28 1,862 130,248 66.50 6,425.000 |
| Miscellaneous | N 3 188 12,510 62.66 728.667 | 5 325 22,935 65.00 1,810.000 | 3 185 11,441 61.66 32.667 | 2 148 11,152 74.00 200.000 | 7 553 45,759 79.00 2,072.000 |

SUMMARY OF ANALYSIS OF VARIANCE

| Source of Variation | df | S.S. | M.S. | F | F ₀₅ | F ₀₁ | Hypothesis |
|------------------------|-----|------------|---------|-------|-----------------|-----------------|------------|
| Plans | 3 | 2,719.419 | 906.473 | 3.965 | 2.65 | 3.89 | Rejected |
| Groups | 4 | 984.349 | 246.087 | 1.076 | 2.41 | 3.41 | Accepted |
| Interaction | 12 | 2,617.569 | 218.131 | | | | Accepted |
| Within | 197 | 45,027.241 | 228.564 | | | | |

TABLE XIX
SUMS, SUMS OF SQUARES AND REDUCTION DATA OF THE SCORES OF THE EXPERIMENTAL GROUPS ON THE
LISTENING TEST WHEN CLASSIFIED BY VOCATIONAL-PROFESSIONAL PLANS

| Vocational- Professional Plans | Group A | Group B | Group C | Group D | Group E |
|--|--|---|---|---|---|
| Teaching | N 17 Sums 918 SS 50,616 X 54.00 ss 1,044.000 | 15 846 48,098 56.40 383.600 | 16 862 47,166 53.87 725.750 | 12 663 36,947 55.25 316.250 | 30 1,593 85,649 53.10 1,060.700 |
| Professions, Private Busi- ness, Self- employed & Government | N 3 Sums 430 SS 23,342 X 53.75 ss 229.500 | 3 172 9,880 57.33 18.667 | 3 171 9,809 57.00 62.000 | 3 178 10,602 59.33 40.667 | 22 1,172 63,638 53.27 1,202.364 |
| Housewife, Travel & Undecided | N 10 Sums 512 SS 26,386 X 51.20 ss 171.600 | 13 680 36,398 52.30 828.769 | 8 417 22,035 52.12 298.875 | 9 515 29,597 57.22 127.556 | 28 1,439 75,449 51.39 1,494.679 |
| Miscellaneous | N 3 Sums 171 SS 9,843 X 57.00 ss 96.000 | 5 265 14,419 53.00 374.000 | 3 172 9,902 57.33 40.667 | 2 108 5,840 54.00 8.000 | 7 407 23,711 58.14 46.857 |

SUMMARY OF ANALYSIS OF VARIANCE

| Source of Variation | df | S.S. | M.S. | F | F ₀₅ | F ₀₁ | Hypothesis |
|------------------------|-----|-----------|--------|-------|-----------------|-----------------|------------|
| Plans | 3 | 199.972 | 66.657 | 1.532 | 2.65 | 3.88 | Accepted |
| Groups | 4 | 96.246 | 24.061 | | | | Accepted |
| Interaction | 12 | 358.897 | 29.908 | | | | Accepted |
| Within | 197 | 8,570.501 | 43.505 | | | | |

TABLE XX
SUMS, SUMS OF SQUARES AND REDUCTION DATA OF THE SCORES OF THE EXPERIMENTAL GROUPS ON THE
LANGUAGE KNOWLEDGE TEST WHEN CLASSIFIED BY VOCATIONAL-PROFESSIONAL PLANS

| Vocational- Professional Plans | Group A | Group B | Group C | Group D | Group E |
|--|--|---|---|---|---|
| Teaching | N 17 Sums 520 SS 16,354 X 30.58 ss 418.118 | 15 473 15,299 31.53 383.733 | 16 517 17,359 32.31 653.438 | 12 416 14,764 34.66 342.667 | 30 1,002 34,768 33.40 1,301.200 |
| Professions, Private busi- ness, Self- employed & Government | N 8 Sums 222 SS 6,292 X 27.75 ss 131.500 | 3 111 4,361 37.00 254.000 | 3 109 4,163 36.33 202.667 | 3 94 2,986 31.33 40.667 | 7 254 9,620 36.28 403.429 |
| Housewife, Travel & Undecided | N 10 Sums 276 SS 8,196 X 27.60 ss 578.400 | 13 388 12,168 29.84 587.692 | 8 273 9,655 34.12 338.875 | 9 288 9,498 32.00 282.000 | 29 905 30,911 32.32 1,660.107 |
| Miscellaneous | N 3 Sums 97 SS 3,267 X 32.33 ss 130.667 | 5 190 7,460 38.00 240.000 | 3 101 3,419 33.66 18.667 | 2 68 2,344 34.00 32.000 | 7 254 9,620 36.28 903.429 |

SUMMARY OF ANALYSIS OF VARIANCE

| Source of Variation | df | S.S. | M.S. | F | F ₀₅ | F ₀₁ | Hypothesis |
|------------------------|-----|-----------|--------|-------|-----------------|-----------------|------------|
| Plans | 3 | 205.623 | 68.541 | 1.383 | 2.65 | 3.83 | Accepted |
| Groups | 4 | 351.469 | 87.867 | 1.772 | 2.41 | 3.41 | Accepted |
| Interaction | 12 | 310.123 | 25.843 | | | | Accepted |
| Within | 197 | 9,763.291 | 49.559 | | | | |